

Toshio SHIN\*: Diatoms from Yamagawa diatomite deposit in  
Kagoshima Prefecture, Japan.

新 敏 夫\*: 鹿兒島縣山川硅藻土鑛床の化石硅藻

In the botanical studies of the Japanese diatomite deposits, any record can rarely be found except those of Mr. H. Okuno. The present writer, on his tour of the collection of Bryophyta in August, 1940, inspected the deposit of Yamagawa, Kagoshima-ken, and since then was investigating the contained fossil diatoms. I was obliged to give up the study, because I was enlisted. I send to Mr. Okuno the material and the result of study including sketches. After my demobilization, he sent back the sketches to me. Herewith I will represent the part to public.

This study was done under the guidance of Dr. Horikawa, Professor of Hiroshima University, to whom I must display my hearty thanks, and furthermore, I am very grateful to Mr. Okuno, for his having preserved the sketches safely during and since the furious war and for his kindness to have corrected the errors in it.

1, *Melosira granulata* (Ehrenberg) Ralfs. (Fig. 1)

Valves cylindrical. Diameter 5—21  $\mu$ , height 5—18  $\mu$ , striae spiral, 7—15 in 10  $\mu$ , pointed 10—15 in 10  $\mu$ .

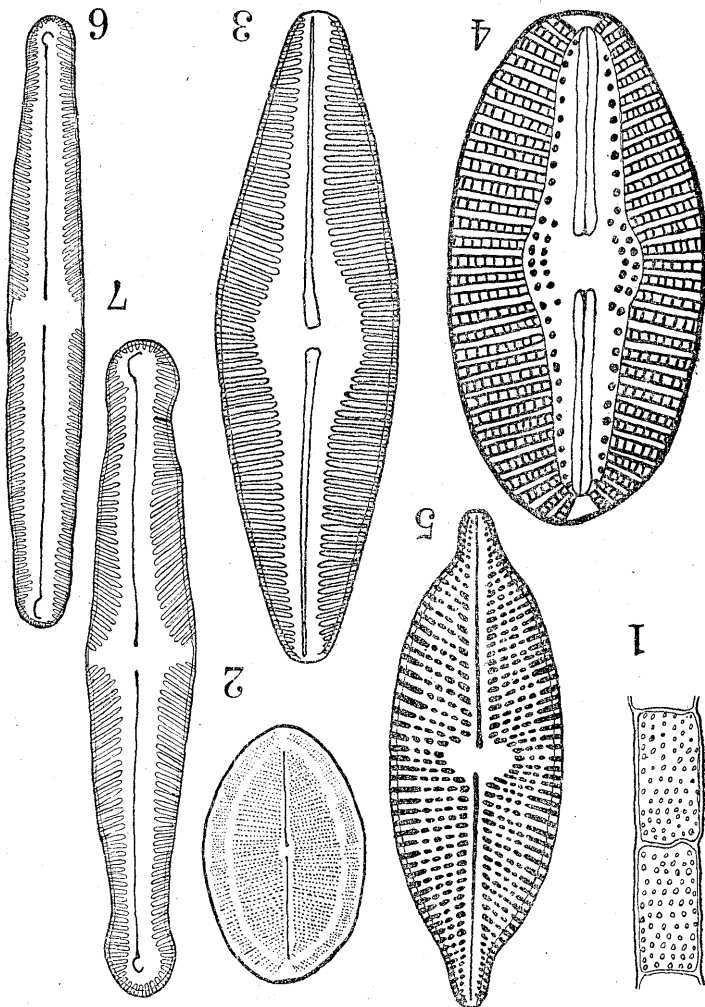
2, *Cocconeis placentula* Ehrenberg var. *lineata* (Ehrenberg) Cleve (Fig. 2) Valve, typically elliptic. Length 11—70  $\mu$  (20  $\mu$ ); Breadth 8—40  $\mu$  (13  $\mu$ ). Upper valves with narrow pseudoraphe. Central area absent. Striae about 26 in 10  $\mu$ , very fines irregularly pointed, crossed by irregularly arranged longitudinal hyaline spaces. Lower valve with raphe, central pores nearing together in the middle part. Axial area very narrow. central area somewhat orbicular. Striae radiate, 25—26 in 10  $\mu$ , very finely pointed, near the margin, crossed by a hyaline ring, between the ring and the margin with a hyaline space.

3, *Caloneis permagna* Bailey (Fig. 3)

Valve broad rhombic-lanceolate. Length 150—220  $\mu$ , breadth 35—55  $\mu$ . Striae 9 to 10 in 10  $\mu$ .

4, *Diploneis elliptica* (Kützinger) Cleve (Fig. 4)

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1. *Melosira granulata* ( $\times 1200$ );
2. *Caecocelis placentalis* ( $\times 1200$ );
3. *Caloneis permasina* ( $\times 1200$ );
4. *Diploneis elliptica* ( $\times 800$ );
5. *Navicula fuscula* ( $\times 1200$ );
6. *Pinnularia gibba* ( $\times 800$ );
7. *Pinnularia gibba* f. *subundulata* ( $\times 800$ ).

Valves rhombic-elliptical, with more or less strongly convex margin and rounded ends. Length  $20-130 \mu$  ( $36 \mu$ ), Breadth  $10-60 \mu$  ( $20 \mu$ ). Central nodules somewhat large, orbicular-quadrate, furrows narrow, curved close to the horns. Striae radiate, 8-13 (8-9) in  $10 \mu$  crossed by irregularly arranged longitudinal lines,

about 8–9 in  $10\mu$ .

5, *Navicula tuscula* (Ehrenberg) Kützing (Fig. 5)

Valves lanceolate, with rostrate ends. Length  $12-70\mu$  ( $50\mu$ ), Breadth  $7-22\mu$  ( $18\mu$ ), Striae radiate, 10–14 in  $10\mu$ .

6, *Pinnularia gibba* Ehrenberg (Fig. 6)

Valves linear-lanceolate with slightly apiculate apex. Length  $56-58\mu$ , Breadth  $7-9\mu$ . Striae radiate, 9 in  $10\mu$ .

7, *Pinnularia gibba* Ehrenberg forma *snbundulata* A. Mayer (Fig. 7)

Valves linear, with slightly undulate margin and somewhat capitate ends. Length  $50-140\mu$ , Breadth  $7-13\mu$ , Striae 12 in  $10\mu$ , in the middle part divergent and shorter than at the other parts, at the ends convergent.

8, *Pinnularia gentilis* (Donkin) Cleve (Fig. 8)

Valves linear, with parallel margins and broad, rounded ends, slightly inflated in the middle. Length  $140-250\mu$  ( $172\mu$ ), Breadth  $22-36\mu$  ( $24\mu$ ). Median line slightly complex, with somewhat approximate central pores and comma-shaped terminal fissures. Axial area narrow, less than one-third of the breadth of the valve ( $6\mu$ ). Central area widened ( $11\mu$ ). Striae 6–8 in  $10\mu$ , divergent in the middle, convergent at the ends, crossed by a moderately broad not very distinct, longitudinal band.

9, *Fragilaria pinnata* Ehrenberg (Fig. 9)

Valves in girdle view rectangular, building close filaments. In valve view, elliptic, with somewhat convex margin and round ends. Length  $3-35\mu$  ( $7\mu$ ), Breadth  $3-6\mu$  ( $4\mu$ ). Striae 10–12 in  $10\mu$ , at the ends slightly radiate. Pseudoraphe linear.

10, *Fragilaria construens* (Ehr.) Grun. (Fig. 10)

Valve broad-lanceolate with rostrate ends. Length  $8-10\mu$ , Breadth  $4-6\mu$ ; Striae 15–18 in  $10\mu$ .

11, *Fragilaria construens* (Ehr.) Grun. var. *subsalina* Hustedt. (Fig. 11)

Valve linear-lanceolate with obtuse ends. Length  $12\mu$ , breadth  $3-4\mu$ , striae 15 in  $10\mu$ .

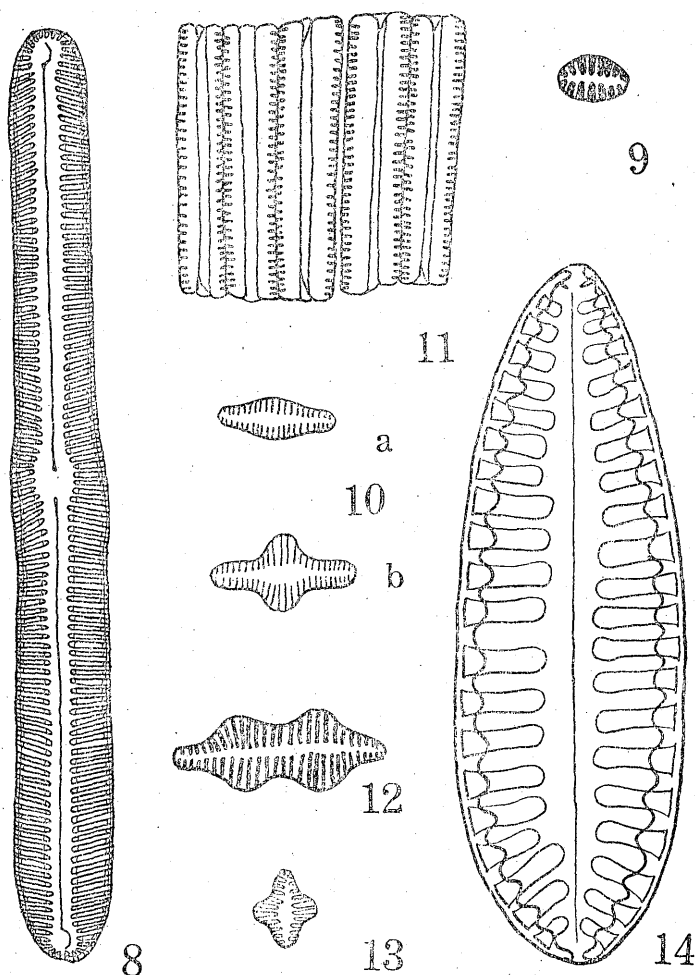
This variety differ from the type in its narrower valves.

12, *Fragilaria construens* (Ehr.) Grun. var. *binodis* (Ehr.) Grun. (Fig. 12)

Valve biconstricted. Length  $17-20\mu$ , breadth  $5-6\mu$ . Striae 15 in  $10\mu$ .

13, *Fragilaria Harrisonii* W. Smith. (Fig. 13)

Valve broad, cross-shaped with round ends. Length  $14\mu$ , breadth  $8\mu$ . Pseudoraphe narrow. Costae very distinct.



8. *Pinnularia gentilis* ( $\times 320$ ); 9. *Fragilaria pinnata* ( $\times 1200$ );  
 10. *Fragilaria construens* ( $\times 1200$ ); 11. *Fragilaria construens* var.  
*subsalina* ( $\times 1200$ ); 12. *Fragilaria construens* var. *binodis*  
 ( $\times 1200$ ); 13. *Fragilaria Harrisonii* ( $\times 1200$ ); 14. *Surirella*  
*robusta* ( $\times 320$ ).

14, *Surirella robusta* Ehr. (Fig. 14)

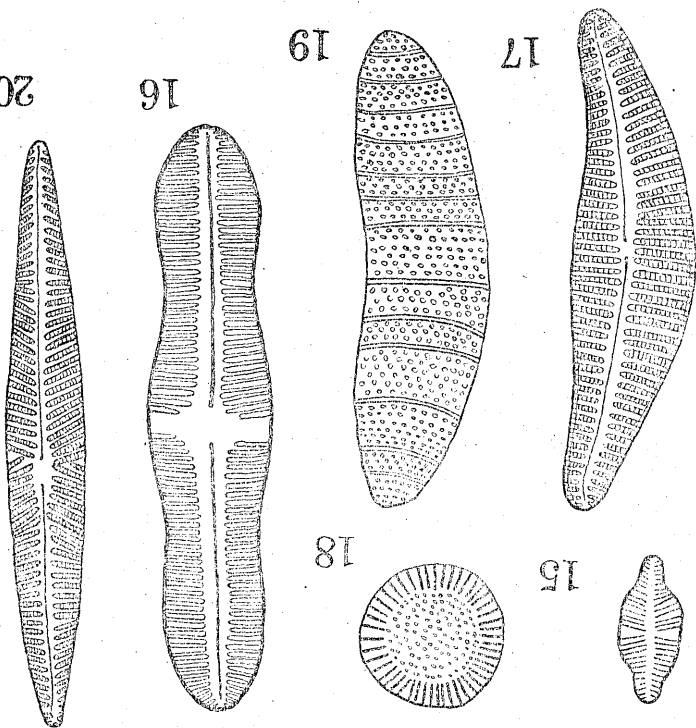
Valve elongate-ovate, on end much broader than the other. Length  $195\mu$ , breadth  $85\mu$ . Costae robust, radiate at the ends. Pseudoraphe lanceolate.

The following determination is not very satisfactory.

15, *Achnanthes exigua*? (Fig. 15)

16, *Caloneis silicula*? (Fig. 16)

17, *Gymbella tumida* or *C. aspera*? (Fig. 17)



15. *Achnanthes exigua*? ( $\times 1200$ ); 16. *Caloneis silicula*? ( $\times 1200$ ); 17. *Gymbella tumida* or *C. aspera*? ( $\times 800$ ); 18. *Cyclotella Kützingeriana* var. *planetophora*? ( $\times 1200$ ); 19. *Epithemia zebra* var. *saxonica*? ( $\times 1200$ ); 20. *Navicula peregrina*? ( $\times 800$ ).

18, *Cyclotella Kützingeriana* var. *planetophora*? (Fig. 18)

19, *Epithemia zebra* var. *saxonica*? (Fig. 19)

20, *Navicula peregrina*? (Fig. 20).

# Addition

Mr. H. Okuno reported the following 3 spp. and 1 var. from this deposit, in his Studies on Japanese Diatomite Deposits, Bot. Mag. (Tokyo) 57 (1943) p. 364-370, and 58, (1944) p. 8-14, but I could not find (1) and (4) in my material.

(1) *Cyclotella comta* (Ehrenberg) Kützinger, (2) *Melosira granulata* (Ehrenberg) Ralfs, (3) *Navicula tuscula* (Ehrenberg) Kützinger, (4) *Epithemia zebra* (Ehrenberg) Kützinger var. *porcellus* (Kützinger) Grunow.